

REMARKS

Claims 1, 3-22, 24, 25, and 27-29 are pending in the present Application, and all have been rejected in the Office Action. Entry of the amendments to the claims and reconsideration of the claims is respectfully requested.

Rejections under 35 U.S.C. §102(e)

In paragraph 3, claims 28 and 29 have been rejected under 35 U.S.C. §102(e) as being anticipated by *Greene et al.* (US 6,480,205). Applicant traverses.

The Examiner contends that *Greene et al.* teaches a reference frame wherein “based on the selected reference frame, a coordinate transformation for the tiles can then be performed.” The Examiner then refers to the tile 220 of Figure 2, wherein the origin of the coordinate reference frame (x’,y’) is the geometric center of the tile 212.

A closer reading of *Greene et al.*, however, shows that “[t]he origin of the coordinate frame is located at the tile’s lower-left corner.” (col. 14, ln 26-27). Thus, “[e]ach tile ... has an associated coordinate frame positioned and scaled relative to that tile as illustrated in Fig. 10.” (col. 14, ln 38-40). FIG. 10 of *Greene et al.* clearly shows the coordinate reference frame originating in the lower left hand corner of the tile.

The Examiner is incorrectly interpreting Figure 2 of *Greene et al.* in arguing that the coordinate reference frame is located at the center of the tile. The “tile 212” is not a tile as contemplated by the Examiner, but a “region [that] is a 4x4 array of 4x4 tiles.” (col. 8, ln 61). “FIG. 2 shows the coordinate frames (e.g., 222, 224) of the eight 4x4 tiles that would be traversed during hierarchical tiling of the triangle 214.” (col. 14, ln 40-42). Each of these coordinate frames are located in the lower-left corner of their respective tile.

As such, claim 28, which comprises a “coordinate reference frame located at a geometric center of the tile,” is not anticipated by *Greene et al.* Further, claim 29, by virtue of depending from claim 28, is not anticipated for the same reasons as claim 28.

Rejections under 35 U.S.C. §103(a)

Claims 1, 3-4, 6-7, and 9-10 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Duluk et al.* (US 6,664,959) in view of *Bowen et al.* (US 6,329,996), and claims 5 and 8 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Duluk*

et al. in view of *Bowen et al.* and *Greene et al.* Additionally, claim 11 has been rejected under 35 U.S.C. §103(a) as being unpatentable over *Duluk et al.* in view of *Bowen et al.* and *Larson et al.* Applicant traverses.

Claim 1 recites a system for identifying pixels inside a graphics primitive of a raster image comprising a graphics engine coupled to the memory, and comprising a pipeline structure comprising a first plurality of sequential logic circuits coupled in series, each of the sequential logic circuits configured to receive a different polygonal portion of the raster image and to determine whether the received polygonal portion is at least partly inside the graphics primitive.

Applicant notes that *Duluk et al.* does not teach or suggest a plurality of sequential logic circuits configured to receive a different polygonal portion of the raster image and to determine whether the received polygonal portion is at least partly inside the graphics primitive. Instead, *Duluk et al.* only teaches a single Stamp Selection Logic 9008 that “determine(s) the set of stamps within each stamp row of the tile that are actually touched by the primitive” (col. 30 lines 6-9). Although FIG. 14 shows the Stamp Selection Logic 9008 contains Subrasterizer 9052 and Column Selection 9054 in series, Column Selection unit 9054 does not participate in the process of determining whether a stamp is actually touched by the primitive.

Specifically, *Duluk et al.* describes “[t]he process of determining the set of stamps within a stamp row that is touched by a primitive” in col. 30 at lines 33-52, and col. 35 line 66 to col. 37 line 50 describes how the Subrasterizer 9052 performs the process. At the end of the processing, “[f]or each row, the visible stamp set is sent to the Column Selection block 9054” (col. 36 lines 50-52). Then, “[t]he Column Selection unit 9054...tells the Z Cull unit 9012 which stamp to process in each clock cycle” (col. 37 lines 10-12). It is clear that Column Selection 9054 does not determine the set of stamps within a stamp row that is touched by a primitive and therefore is not one of a plurality of logic circuits that determine whether a received polygonal portion is at least partly inside a graphics primitive. Thus, Subrasterizer 9052 and Column Selection 9054, even though in series, do not constitute a plurality of sequential logic circuits *each* configured to determine whether a received polygonal portion is at least partly inside a graphics primitive, as required by claim 1.

Since the single Stamp Selection Logic 9008 is not a *plurality* of sequential logic circuits coupled in series, and Subrasterizer 9052 and Column Selection 9054, do not *each* determine whether a received polygonal portion is at least partly inside a graphics primitive, *Duluk et al.* does not teach or suggest a plurality of sequential logic circuits configured to receive a different polygonal portion of the raster image and to determine whether the received polygonal portion is at least partly inside the graphics primitive, as required by claim 1. Thus, the combination of *Duluk et al.* and *Bowen et al.* does not teach or suggest every element of claim 1 as required to make a proper *prima facie* case of obviousness. Applicant therefore requests that the Examiner withdraw the 35 U.S.C. §103(a) rejection of claim 1, and claims 3-4, 6-7, and 9-10 depending therefrom.

Applicant also notes the further patentability of some of the dependent claims. For example, claim 4 recites the further limitation that the pipeline structure determines whether the polygonal portion of the raster image is at least partly inside the graphics primitive by evaluating edge functions of the graphics primitive on at least one corner vertex of the polygonal portion. In *Duluk et al.* the Subrasterizer 9052 does not evaluate edge functions of the graphics primitive on at least one corner vertex. Although Subrasterizer 9052 “receives the vertex and slope data it needs to compute the the [sic] left most and right most positions of the primitive in each subraster line” (col. 36 lines 20-23), Applicant contends that *Duluk et al.* does not compute the left and right most positions by evaluating an edge function of the primitive on the vertex.

The present Application notes that “[u]nder the edge function technique, an edge function is generated for each of three edges 202, 204 and 206 of an exemplary graphics primitive 200” (paragraph [0009] page 3) and each edge function is a function of a normal vector (equation 9 page 4). However, *Duluk et al.* neither describes evaluating such edge functions nor teaches the same equations. Claims 5 and 6, depending from claim 4, are further patentable for at least the same reasons as claim 4.

Claim 9 recites the limitations of claim 3 and the further limitations that the predetermined number of polygonal subportions is two and the pipeline structure determines the two polygonal subportions “by determining midpoint values of two opposite sides of the polygonal portion of the raster image and using the midpoint values as vertices of the two polygonal subportions.” In *Duluk et al.* the “Subrasterizer 9052...computes...for

each of the sample points in the stamp, in a preferred embodiment there are 16 samples per stamp" (col. 36 lines 30-33). Nowhere does *Duluk et al.* teach or suggest that the number of samples per stamp is two, or that the samples are determined by determining midpoint values of two opposite sides of the stamp.

Claims 12-22, 24, 25 and 27 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Larson et al.* (US 6,359,623) in view of *Greene et al.* Applicant traverses. As discussed above, *Greene et al.* does not disclose having a coordinate reference frame located at a geometric center of the tile. The addition of *Larson et al.* does not cure the deficiencies of *Greene et al.*.

Additionally, in order to more clearly distinguish the present Application, claims 12, 20, and 22 have been amended to include the further limitations of relocating the reference coordinate frame to the geometric center of each subtile/subportion after each division of the preceding tile. The support for these amendments is found in the Application in [0056]. Neither *Greene et al.* nor *Larson et al.* teach or suggest this relocating process after each division of the tile.

As such, claims 12, 20, and 22 are not obvious over *Larson et al* in view of *Greene et al.* Claims 13-19, which depend from claim 12, are allowable for at least the same reasons as that of claim 12. Similarly, claims 21 and 27 are allowable for the same reasons as that of claim 20, and claims 24-25 are allowable for the same reasons as that of claim 22.

CONCLUSION

Based on the foregoing amendments and remarks, Applicant believes that the rejections in the Office Action are fully overcome and that the Application is in condition for allowance. Should the Examiner have questions, the Applicant's undersigned attorney may be reached at the number provided.

Respectfully submitted,

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